REMARKS

This is intended as a full and complete response to the Office Action dated February 13, 2006, having a shortened statutory period for response set to expire on May 13, 2006. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-18 remain pending in the application and are shown above. Claims 19-26 have been canceled by Applicants. Claims 1-18 are rejected. Reconsideration of the rejected claims is requested for reasons presented below.

The specification is objected to. Applicants have amended paragraph [0031] to refer to load locks 104 and 106 rather than load locks 102 and 104, as requested by the Examiner. Applicants have amended paragraph [0033] to refer to load locks 304 and 306 rather than load locks 302 and 304, as requested by the Examiner. Applicants respectfully request withdrawal of the objection to the specification.

Restriction to one of the following inventions is required under 35 U.S.C. § 121:

I. Claims 1-18, drawn to a method, classified in class 427, subclass 569.

II. Claims 19-26, drawn to a product, classified in class 438, subclass1+.

Applicants elect group I, claims 1-18. Applicants have canceled claims 19-26.

Claims 1 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because of the term "SiO_xN_y." Applicants have amended claims 1, 10, 13, and 15 to replace the term "SiO_xN_y" with "silicon oxynitride." Applicants submit that the changes made herein do not introduce new matter and are supported by the specification. Applicants respectfully request withdrawal of the rejection of claim 1.

Applicants have also amended claim 1 to clarify that the structure is heated in an atmosphere comprising NH_3 to incorporate nitrogen into a top surface of the silicon oxide film. Applicants submit that the changes made herein do not introduce new matter.

Claims 1-3, 5, and 7-9 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Cheng, et al.* (U.S. Patent No. 6,649,538). The Examiner states that *Cheng, et al.* describes a method for forming a nitride gate oxide including a nitriding annealing process in an ambient including NH_3 and then exposing the gate oxide to a

plasma nitriding treatment comprising a nitrogen source. Applicants respectfully traverse the rejection.

Cheng, et al. describes a preferred process in which a nitrided gate oxide is formed in a parallel oxidation/nitriding process (column 4, lines 34-37). *Cheng, et al.* also provides an alternative process in which a silicon oxide gate oxide is formed followed by a nitriding annealing process in an ambient including at least one of NH_3, NO, and N_2 (column 4, lines 39-42). *Cheng, et al.* states that the nitriding annealing process is less preferred compared to the parallel oxidation/nitriding process because nitrogen is incorporated less uniformly and that in particular, NH_3 is less preferred because it is believed to increase electron trapping (column 4, lines 42-49). Applicants respectfully submit that *Cheng, et al.* does not teach, suggest, or motivate using NH_3 to incorporate nitrogen into a top surface of a silicon oxide film.

Thus, *Cheng, et al.* does not teach, show, or suggest a method of forming a gate dielectric, comprising providing a structure comprising a silicon oxide film formed on a silicon substrate, heating the structure in an atmosphere comprising NH_3 to incorporate nitrogen into a top surface of the silicon oxide film, and then exposing the structure to a plasma comprising a nitrogen source to form a silicon oxynitride gate dielectric on the substrate, as recited in claim 1. Applicants respectfully request withdrawal of the rejection of claim 1 and of claims 2-3, 5, and 7-9, which depend thereon.

Claims 10-12, 14, and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Cheng, et al.* in view of *Kiryu, et al.* (U.S. Patent Publication No. 2004/0053472). The Examiner acknowledges that *Cheng, et al.* does not teach using an integrated system to form a silicon oxynitride gate dielectric wherein the structure is heated in a NH_3 atmosphere in a first processing chamber and then transferred to a second chamber where it is exposed to a plasma. The Examiner notes that *Kiryu, et al.* discloses an apparatus for forming a gate insulator which enables forming a gate dielectric using a cluster tool with chambers that performs processes including film forming, annealing, and removal of oxide films. The Examiner asserts that it would have been obvious to perform *Cheng, et al.*'s process in the apparatus of *Kiryu, et al.* where a first processing chamber is used for heating the substrate in a NH_3

atmosphere and a second chamber is used for exposing the substrate to a plasma containing a nitrogen source because *Kiryu, et al.* teaches that the apparatus can be used to form a gate insulator such as silicon oxynitride and the apparatus includes film forming and annealing chambers. Applicants respectfully traverse the rejection.

Kiryu, et al. describes forming a silicon oxide film by oxidizing a silicon substrate in a chamber and then exposing the substrate in the same chamber to nitrogen radicals to incorporate nitrogen into the film (paragraphs [0069]-[0080]). *Kiryu, et al.* does not teach or suggest incorporating nitrogen into the film in a two step process including heating the substrate in an atmosphere comprising NH_3 and then exposing the substrate to a plasma comprising a nitrogen source. While *Kiryu, et al.* describes a cluster tool including chambers for film forming and film annealing, *Kiryu, et al.* does not teach or suggest forming a silicon oxynitride film in two different chambers, wherein a substrate is heated in an atmosphere comprising NH_3 in one chamber and then exposed to a plasma comprising a nitrogen source in another chamber. Applicants respectfully submit that *Cheng, et al.* and *Kiryu, et al.*, individually or in combination, do not suggest or motivate heating a structure comprising a silicon oxide film formed on a silicon substrate in an atmosphere comprising NH_3 in a first processing chamber of the integrated processing system to incorporate nitrogen into the silicon oxide film, transferring the structure to a second processing chamber of the integrated processing system, and then exposing the structure to a plasma comprising a nitrogen source in the second processing chamber to form a silicon oxynitride gate dielectric on the substrate, as recited in claim 10. Applicants respectfully request withdrawal of the rejection of claim 10 and of claims 11-12, 14, and 16, which depend thereon.

Applicants further traverse the rejection of dependent claim 12. As discussed above, *Kiryu, et al.* describes forming a silicon oxide film and then incorporating nitrogen into the film in the same chamber. Applicants respectfully submit that *Cheng, et al.* in view of *Kiryu, et al.* does not teach, suggest, or motivate forming a silicon oxide film on a substrate in one chamber, heating a structure comprising the silicon oxide film in an atmosphere comprising NH_3 in another chamber, and exposing the

structure to a plasma comprising a nitrogen source in yet another chamber. Applicants respectfully request withdrawal of the rejection of claim 12.

Claims 4 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Cheng, et al.* in view of *Kiryu, et al.* and in view of *Niimi, et al.* (U.S. Patent No. 6,548,366). Applicants respectfully traverse the rejection.

Cheng, et al. and *Kiryu, et al.* are discussed above. *Niimi, et al.* provides a method that includes plasma nitriding a silicon oxide layer but does not teach or suggest heating a structure in an atmosphere comprising NH_3 to incorporate nitrogen into a top surface of a silicon oxide film before plasma nitriding the film. Furthermore, *Niimi, et al.* does not teach or suggest forming a silicon oxynitride film in two different chambers, wherein a substrate is heated in an atmosphere comprising NH_3 in one chamber and then exposed to a plasma comprising a nitrogen source in another chamber. Thus, *Niimi, et al.* does not provide or suggest the elements of independent claims 1 and 10 that are not provided or suggested by *Cheng, et al.* in view of *Kiryu, et al.* Applicants respectfully request withdrawal of the rejection of claim 4, which includes the limitations of claim 1. Applicants respectfully request withdrawal of the rejection of claim 17, which includes the limitations of claim 10.

Claims 6 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Cheng, et al.* in view of *Kiryu* as applied to claims 1 and 10 above, and further in view of *Ibok* (U.S. Patent Publication No. 2001/0049186). Applicants respectfully traverse the rejection.

Ibok describes a method of forming a gate insulator that includes annealing an oxide film in ammonia. However, *Ibok* does not teach or suggest heating a structure in an atmosphere comprising NH_3 to incorporate nitrogen into a top surface of a silicon oxide film before plasma nitriding the film or forming a silicon oxynitride film in two different chambers, wherein a substrate is heated in an atmosphere comprising NH_3 in one chamber and then exposed to a plasma comprising a nitrogen source in another chamber. Thus, *Ibok* does not provide or suggest the elements of independent claims 1 and 10 that are not provided or suggested by *Cheng, et al.* in view of *Kiryu, et al.* Applicants respectfully request withdrawal of the rejection of claims 6 and 18.

Claims 13 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Cheng, et al.* in view of *Kiryu, et al.* and further in view of *Burnham, et al.* (U.S. Patent No. 6,780,720). Applicants respectfully traverse the rejection.

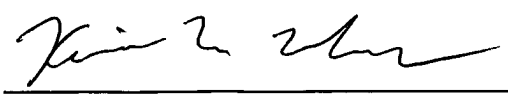
Burnham, et al. provides a method of forming a nitrided silicon oxide gate dielectric comprising plasma nitriding a silicon oxide layer. However, *Burnham, et al.* does not teach or suggest forming a silicon oxynitride film in two different chambers, wherein a substrate is heated in an atmosphere comprising NH_3 in one chamber and then exposed to a plasma comprising a nitrogen source in another chamber. Thus, *Burnham, et al.* does not provide or suggest the elements of independent claim 10 that are not provided or suggested by *Cheng, et al.* in view of *Kiryu, et al.* Applicants respectfully request withdrawal of the rejection of claims 13 and 15.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, Applicants believe that a detailed discussion of the secondary references is not necessary for a full and complete response to this office action.

Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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